

Heat Injury Prevention & Treatment



Heat Injury Hazards are Cumulative

- **H- Heat category past 3 days**
- **E- Exertion level past 3 days**
- **A- Acclimation/ other individual risk factors**
- **T- Temperature/rest overnight**



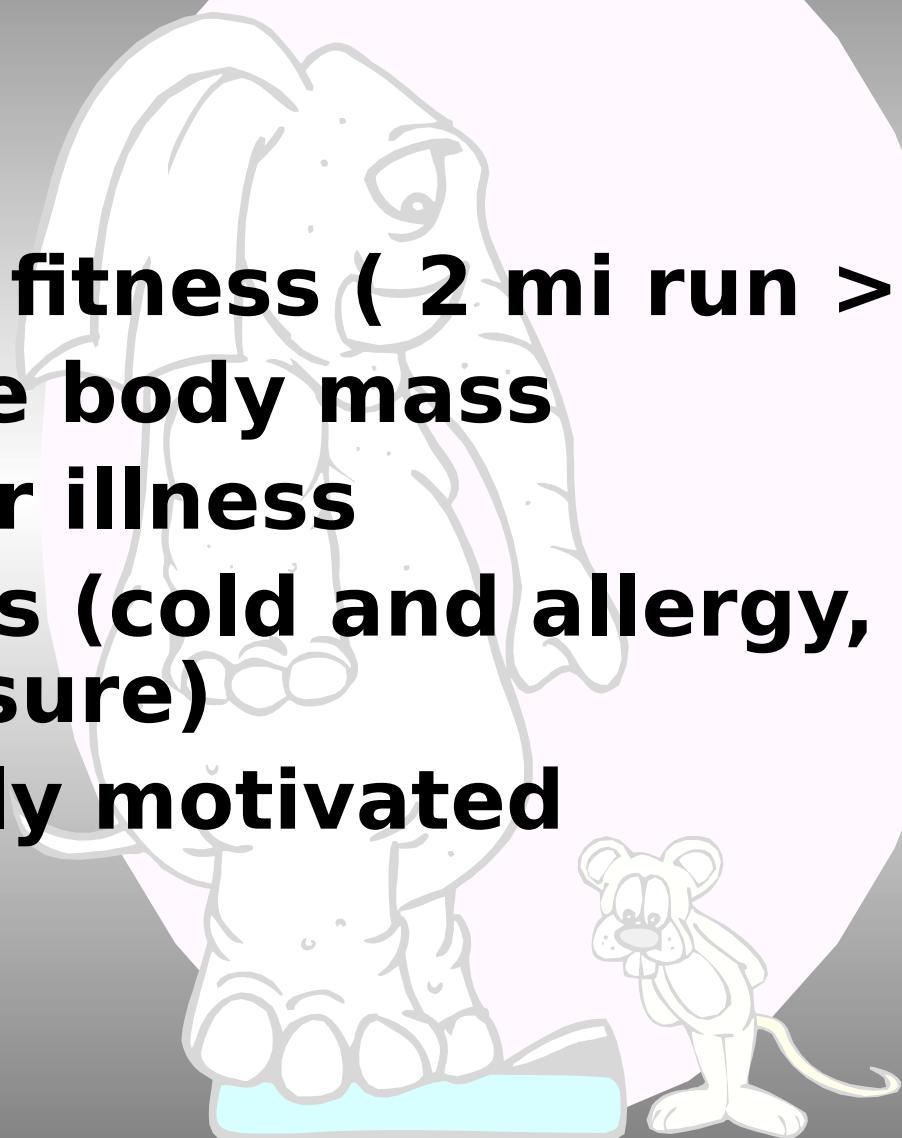
Cluster of heat injuries on prior

days =

HIGH RISK

Individual Risk Factors

- Poor fitness (2 mi run > 16 min)
- Large body mass
- Minor illness
- Drugs (cold and allergy, blood pressure)
- Highly motivated



Individual Risk Factors

- Supplements- ephedra
- Recent alcohol use
- Prior heat injury
- Skin problems- rash, sunburn, poison ivy
- Age>40



Risk Mitigation

Avoid Heat Loading

- **Modify schedule- time of day, rest**

- **Clothing-**
Loose layers

- **Formations:**
 - Wide spacing
 - Shade soldiers

- **Cumulative- avoid strenuous back-to-back events**



Risk Mitigation

Dump Heat Load

- Cool overnight temp
- Cold showers



Develop Controls

- **Track Wet Bulb Globe Temp (WBGT)**
- **Track hydration of Soldiers**
- **Fluid replacement/ work/ rest guidelines**
- **Keep urine lemonade color (light yellow)**



- **All unit leaders must be familiar with heat injury prevention and recognition**
- **Know the Soldiers who are high risk**
- **Ensure water points accessible/ utilized**

Symptoms of Mild Injury

- Dizziness
- Headache
- Nausea
- Unsteady walk
- Weakness
- Muscle cramps
- These folks need rest, water, evaluation
- **These are your
“canaries in the mine”**



Mild Heat Injury Management



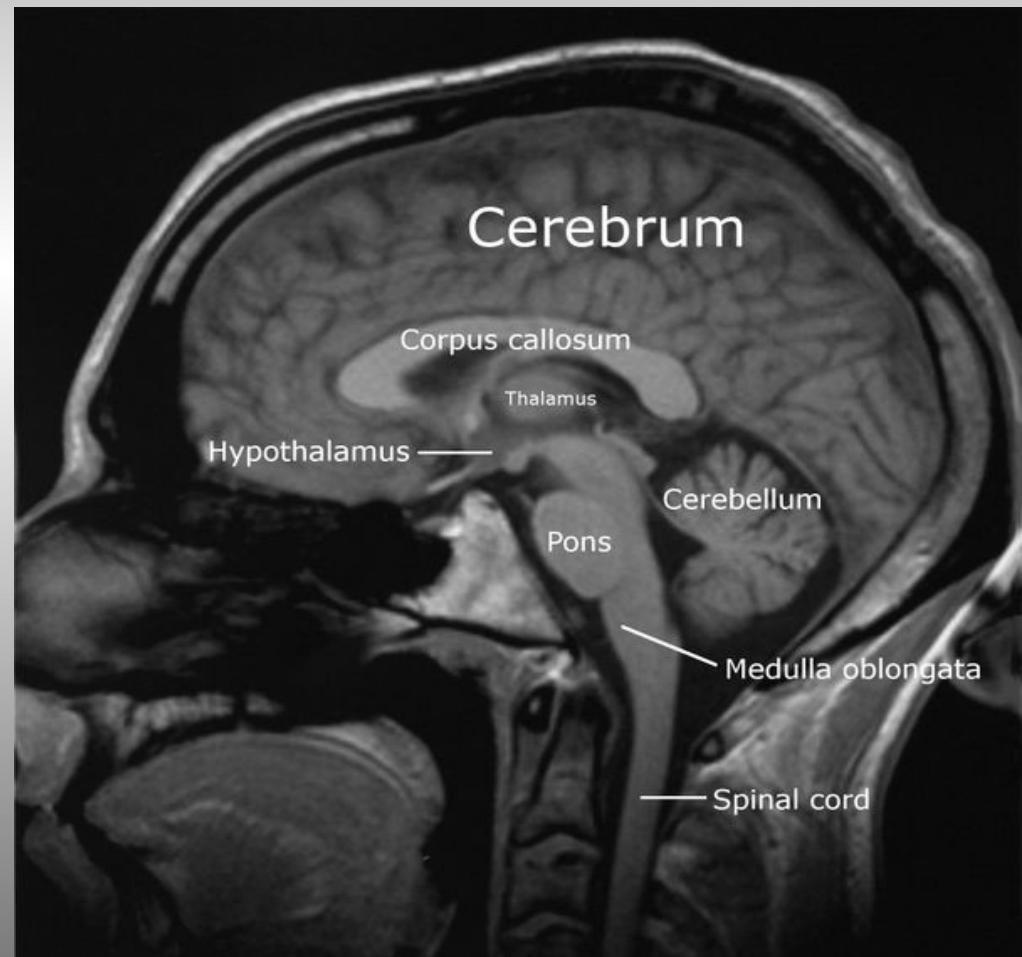
- Rest Soldier in shade
- Loosen uniform/ remove head gear
- Have Soldier drink 2 quarts of water over 1 h
- Evacuate if no improvement in 30 min, or if Soldier's condition worsens



Heat Stroke

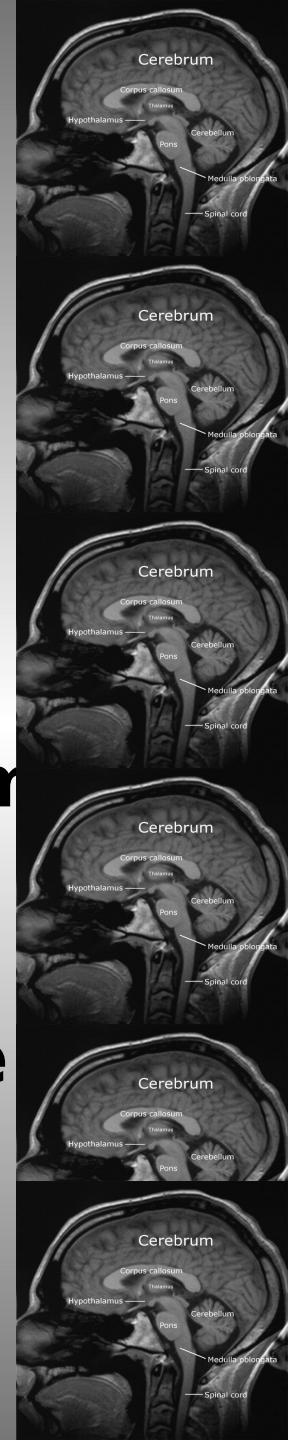
- Abnormal brain function- elevated body temperature

- Examples:
 - Confused
 - Combative
 - Passed out
 - Sudden death



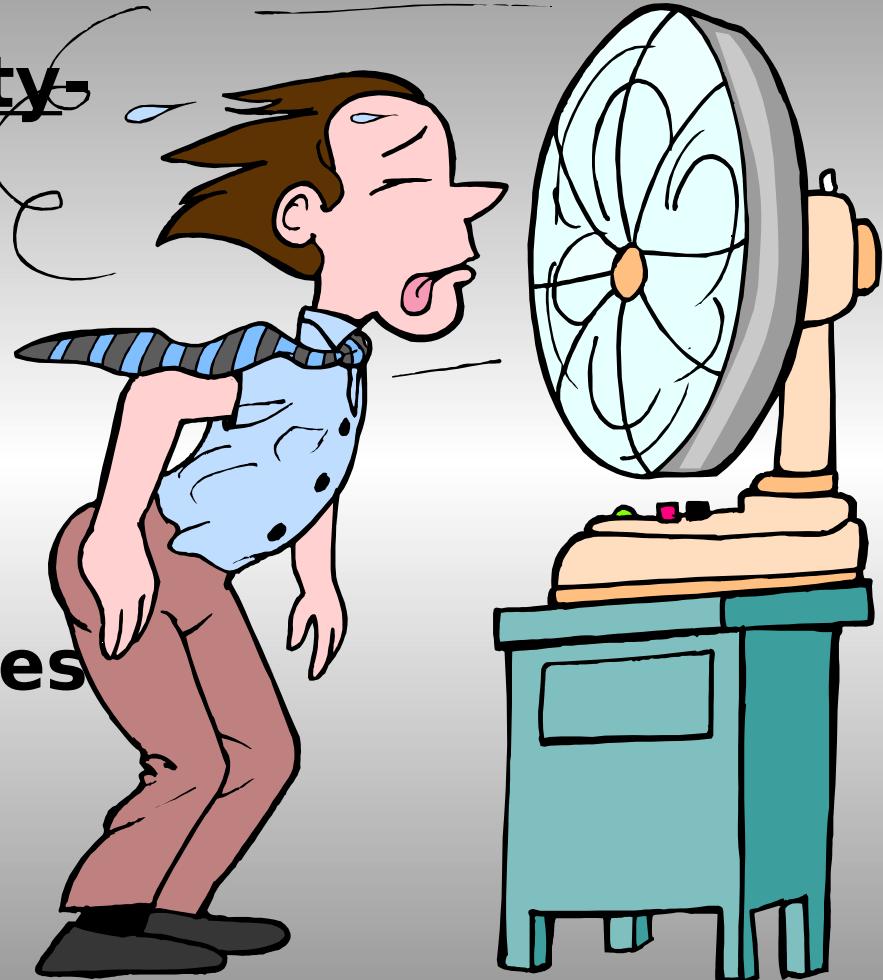
Heat Stroke

- When a soldier's brain isn't working correctly- **COOL** and **CALL**
- Treat any soldier who develops abnormal brain function during warm weather activity as a **heat stroke victim**
- The sooner a victim with heat stroke is cooled, the less damage will be done to his **brain and body**



Pre-Hospital Care

- **Cooling is first priority-**
can reduce mortality
from 50% to 5%
- Drench with water
- Fan
- Iced sheets
- Massage large muscles
while cooling
- Stop if shivering
occurs



Work/Rest and Water Consumption Table

Applies to average sized, heat-acclimated soldier wearing BDU, hot weather. (See TB MED 507 for further guidance.)

Easy Work	Moderate Work	Hard Work
<ul style="list-style-type: none"> • Weapon Maintenance • Walking Hard Surface at 2.5 mph, < 30 lb Load • Marksmanship Training • Drill and Ceremony • Manual of Arms 	<ul style="list-style-type: none"> • Walking Loose Sand at 2.5 mph, No Load • Walking Hard Surface at 3.5 mph, < 40 lb Load • Calisthenics • Patrolling • Individual Movement Techniques, i.e., Low Crawl or High Crawl • Defensive Position Construction 	<ul style="list-style-type: none"> • Walking Hard Surface at 3.5 mph, ≥ 40 lb Load • Walking Loose Sand at 2.5 mph with Load • Field Assaults

Heat Category	WBGT Index, F°	Easy Work		Moderate Work		Hard Work	
		Work/Rest (min)	Water Intake (qt/hr)	Work/Rest (min)	Water Intake (qt/hr)	Work/Rest (min)	Water Intake (qt/hr)
1	78° - 81.9°	NL	½	NL	¾	40/20 min	¾
2 (GREEN)	82° - 84.9°	NL	½	50/10 min	¾	30/30 min	1
3 (YELLOW)	85° - 87.9°	NL	¾	40/20 min	¾	30/30 min	1
4 (RED)	88° - 89.9°	NL	¾	30/30 min	¾	20/40 min	1
5 (BLACK)	> 90°	50/10 min	1	20/40 min	1	10/50 min	1

For additional copies, contact: U.S. Army Center for Health Promotion and Preventive Medicine Health Information Operations Division at (800) 222-9098 or CHPPM - Health Information Operations@apg.amedd.army.mil.

For electronic versions, see <http://chppm-www.apgea.army.mil/heat>. Local reproduction is authorized.

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- The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hrs of work in the specified heat category. Fluid needs can vary based on individual differences ($\pm \frac{1}{4}$ qt/hr) and exposure to full sun or full shade ($\pm \frac{1}{4}$ qt/hr).

- NL = no limit to work time per hr.

- Rest = minimal physical activity (sitting or standing) accomplished in shade if possible.

- CAUTION: Hourly fluid intake should not exceed 1½ qts.

Daily fluid intake should not exceed 12 qts.

- If wearing body armor, add 5°F to WBGT index in humid climates.

- If doing Easy Work and wearing NBC (MOPP 4) clothing, add 10°F to WBGT index.

- If doing Moderate or Hard Work and wearing NBC (MOPP 4) clothing, add 20°F to WBGT index.



HEAT INJURY PREVENTION

Fluid Replacement Guidelines for Warm Weather Training

(Applies to average heat acclimated soldier wearing BDU, Hot Weather)

Heat Category	WBGT Index, °F	Easy Work		Moderate Work		Hard Work	
		Work/Rest	Water Intake, Qt/hr	Work/Rest	Water Intake, Qt/hr	Work/Rest	Water Intake, Qt/hr
1	78-81.9	NL	1/2	NL	3/4	40/20 min	3/4
2 (Green)	82-84.9	NL	1/2	50/10 min	3/4	30/30 min	1
3 (Yellow)	85-87.9	NL	3/4	40/20 min	3/4	30/30 min	1
4 (Red)	88-89.9	NL	3/4	30/30 min	3/4	20/40 min	1
5 (Black)	>90	50/10 min	1	20/40 min	1	10/50 min	1



- The work rest times and fluid replacement volumes hydration volumes will sustain performance for at least 4 hours of work in the specified heat category. Individual water needs will vary approx 1/4 qt or 8 ounces per hour.
- NL=no limit to work time per hour.
- Rest means minimal physical activity (sitting or standing), accomplished in shade if possible.
- **CAUTION: Hourly fluid intake should not exceed 1^{1/2} quarts.**
Daily fluid intake should not exceed 12 quarts.
- Wearing body armor adds 5 degrees Fahrenheit to WBGT Index
- Wearing MOPP overgarment add 10 degrees Fahrenheit to WBGT Index.

Drugs that Interfere with

Heat Regulation

- Antihistamines (benadryl, atarax, ctm)
- Decongestants (sudafed)
- High Blood Pressure (diuretics, beta blockers)
- Psychiatric Drugs (tricyclic antidepressants, antipsychotics)

Scenario

Awake Victim- Muscle Cramps/Headache

- **Move to shade/ or air conditioning**
- **Remove outer layer of clothing/ headgear**
- **2 canteens of water over 1 hour**



Scenario

Awake Victim- Abnormal Behavior

- **Move to shade**
- **Remove outer layer of clothing**
- **Call for evacuation**
- **Begin rapid cooling- iced sheets**
- **CLS qualified individuals may administer an IV after evacuation and cooling started**

Water Intoxication

- Do not “Force Hydration”
- **Mental status changes**
- Vomiting
- History of large volume of water consumed
- Poor food intake
- Abdomen distended/bloated
- Copious clear urine